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Notes on the biennial and perennial West American Species of Lappula

BY C. V. PIPER

In describing *Lappula arida* in this journal (**28**: 44) I briefly called attention to the value of the fornices or appendages in the throat of the corolla as one means of distinguishing that species from *L. ciliata* (Dougl.) Greene. Indeed it was largely by the character of this appendage that it became clear that the handsome blue-flowered species common about Spokane, Wash., was identical with Douglas' original, an authentic specimen of which is in the Gray herbarium. Douglas' plant was in very young flower, so that it was only by comparing the throat appendages that it became certain that his plant was distinct from *L. arida*. In the course of this examination I was struck with the different forms of the throat appendages, which prove on further study to be very constant and therefore a helpful means of identifying specimens in flower only, as well as of distinguishing species. In describing *L. arida*, the fornices were said to be "not retuse." This is an error, as in all the biennial and perennial American species at least the appendage is notched. Briefly the appendage consists of an obcordate erect or connivent swelling, from the lower ventral face of which projects into the throat a protuberance. The size shape and surface of the appendage, the shape of the protuberance, and the relative dimensions of these parts furnish characters, which though difficult to describe, are found to be very reliable. In endeavoring to clear up the northwestern species, it became necessary to examine a large amount of material. The following results are based on a study of the material in

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the Gray herbarium, of that in the California Academy of Science, and of that in the herbaria of Mr. W. C. Cusick and Professor L. F. Henderson, together with my own. Besides the species here considered there are several more undoubtedly distinct species represented in the Gray herbarium, which owing to incomplete material it was not deemed wise to describe. It is very desirable in the future that collectors endeavor to secure both flowering and fruiting specimens of each species. The great bulk of the material in herbaria is either in flower or in fruit, so that it is often very difficult to determine which goes with which. Belated flowers in fruiting material are unsatisfactory, as they are frequently much smaller than is typical and therefore apt to be misleading.

So far as my experience goes in the field, the color of the flowers, contrary to what might be expected, is very constant. While white-flowered specimens are notoriously common in blue-flowered plants, the present genus seems to be exceptional in this respect.

Owing to the great confusion of material in herbaria, a full list of the specimens examined is given under each species.

Key to the Species

Biennials or perennials; nutlets armed on the margins with free or united flat subulate glochidiate prickles.

I. Back of nutlets unarmed or with short glochidiate prickles; marginal prickles free to the base or nearly so.

Corolla appendages smooth or merely papillate.

Appendages broader than long: protuberance short, broad: flowers blue.

Flowers small, 4–6 mm. broad. 1. *L. floribunda.*

Flowers larger, 8–10 mm. broad. 2. *L. diffusa.*

Appendages as long as broad: the oblong protuberance scarcely projecting: flowers white.

Foliage rather softly pubescent. 3. *L. Hendersoni.*

Foliage harshly papillose-scabrous. 4. *L. trachyphylla.*

Corolla appendages pubescent.

Flowers small, less than 5 mm. broad; appendage about as broad as long, short-pilose, the protuberance very small. 5. *L. pinetorum.*

Flowers larger, 5–12 mm. broad.

Appendage short-pilose.

Flowers white: pubescence rather harsh, mostly appressed except on the lower part of the stem and the leaf-margins. 6. *L. arida.*

Flowers blue: pubescence soft, not appressed. 7. *L. saxatilis.*

Flowers blue: pubescence smooth, very closely appressed except a few bristles on the lower petioles. 8. *L. Cusickii.*

Appendage hirsute, the hairs as long or longer: flowers bluish (or sometimes white?). 9. *L. caerulescens.*

II. Back of nutlets unarmed or with short glochidiate prickles; lateral prickles united for about half their length.

Flowers greenish: corolla-lobes broadest at base; appendage smooth, much broader than long, lunate, the protuberance forming a short blunt tooth. 10. *L. hispida.*

Flowers blue: corolla-lobes suborbicular; appendages short-pilose; protuberance short.

Back of nutlets with glochidiate bristles.

Flowers blue: pubescence fine, appressed. 11. *L. ciliata.*

Flowers blue: leaves bristly, green. 12. *L. setosa.*

Flowers white: leaves bristly, ashy-gray. 13. *L. cinerea.*

Back of nutlets without glochidiate bristles.

Back of nutlets coarsely granulate-scabrous, with central ridge faint or none. 14. *L. ursina.*

Back of nutlets nearly smooth, with a prominent central ridge. 15. *L. scaberrima.*

III. Back of nutlets with glochidiate prickles about as long as the marginal ones.

Corolla white, rotate, the tube not exceeding the calyx; appendage broader than long, short pilose. 16. *L. Californica.*

Corolla blue or pink, short-salverform, the tube longer than the calyx.

Corolla 10–15 mm. broad: appendages very large, one third as long as the corolla lobes; protuberance equally long: pubescence velvety. 17. *L. velutina.*

Corolla 6–8 mm. broad: appendages small, one sixth as long as the corolla-lobes, the protuberance very small: pubescence not velvety. 18. *L. nervosa.*

1. LAPPULA FLORIBUNDA Greene, Pittonia, **2**: 182. 1891

Echinospermum floribundum Lehm. Pugillus, **2**: 24. 1830.

Specimens of this species in fruit are very easily distinguished from fruiting specimens of the following, but flowering specimens are sometimes distinguishable only with difficulty. The only differences which seem to separate the two species in flower are the smaller corollas and denser racemes of *L. floribunda*. According to Cusick, *L. floribunda* is always biennial in duration, *L. diffusa* perennial. So far as fruiting material goes there seem to be but two species, but Dr. Rydberg has segregated a third supposed species, *L. leptophylla* Rydb. (Fl. Mont. 329. 1900), of which I have seen no specimen. It is said to be distinguished from *L. floribunda* by having smaller flowers and thinner leaves. It is very desirable that collectors take careful note in the field as to whether variations in the size of the corolla are correlated with

other differences. *L. floribunda* as at present received shows some variation as regards the size of the flowers and also in pubescence.

The following specimens are referred to this species.

WASHINGTON: Yakima Region, July 1883, *Brandegee, 986.*

OREGON: Without locality, 1881, *Cusick, 118.*

CALIFORNIA: Lake Tahoe, *Lemmon;* without locality, 1874, *Lemmon, 734;* Susanville, Lassen county, 2 July 1892, *Brandegee;* Lake City Pass, July, 1892, *Mrs. R. M. Austin.*

IDAHO: Hailey, 22 July 1895, *Henderson, 3195;* Challis Divide, 3 August 1895, *Henderson, 3619.*

NEVADA: Ruby Valley, August 1868, *Watson, 860.*

UTAH: American Fork Cañon, 16 July 1895, *M. E. Jones;* Provo, 8 July 1894, *M. E. Jones, 5594;* Wasatch Mts., July 1869, *Watson, 860.*

ARIZONA: Casnino, August 1883, *Rusby, 746;* Base of San Francisco Mt., September 1884, *J. G. Lemmon & wife.*

COLORADO: Near Dix P. O., 10 July 1898, *Baker, Earle & Tracy, 471;* Golden City, 8 June 1870, *Greene, 306;* Headwaters of Clear Creek, 1861, *Parry, 290;* Estes Park, 8 June 1884, *J. Ball;* Pagosa Springs, July 1899, *Baker, 551;* Canon City, June 1877, *Brandegee;* Clear Creek Cañon, 10 June 1870, *Greene;* Without locality, *Hall & Harbour, 437.*

WYOMING: Yellowstone Lake, 24 August 1899, *A. & E. Nelson, 6647;* Sybille Creek, 8 July 1894, *A. Nelson, 348;* between Sheridan and Buffalo, 15 June–15 July 1900, *Tweedy, 3579.*

MONTANA: Without locality, 3 July 1883, *Scribner, 171;* Glen Creek, 29 July 1899, *A. & E. Nelson, 5561.*

ASSINIBOIA: Crane Lake, 9 June 1894, *Macoun.*

SASKATCHEWAN: Without locality, 1858, *Bourgeau.*

2. LAPPULA DIFFUSA Greene, Pittonia, **2**: 182. 1891

Echinospermum diffusum Lehm. Pugillus, **2**: 23. 1830.

I have followed Dr. Gray in his interpretation of this species and as he compared his material with the type it is doubtless correct. According to this view Lehmann's characterization of the corolla as white is an error. It is barely possible however that Lehmann's original is a different plant from the one here considered, as there are at least three white-flowered species in the Columbia Basin,

whence the type of *E. diffusum* came, viz., *L. Hendersoni*, *L. arida* and *L. Californica*. It is impossible to reconcile either of the first two with the original description of *E. diffusum*, but it is possible that it may prove to be identical with *L. Californica*.

The following specimens have been examined.

BRITISH COLUMBIA: Above Lake Louise, 27 July 1895, *Canby;* Kicking Horse Lake, 11 August 1890, *Macoun;* Lake Louise, 9 August 1898, *J. R. Anderson;* near Banff, 9 July 1891, *Macoun, 676.*

WASHINGTON: Wenatchee Mts., 3 June 1900, *Whited, 1258;* Klickitat River, 27 June 1899, *Flett, 1011;* without locality *Vasey, 420;* near Ellensburg, 21 May 1897, *Piper, 2669;* Blue Mts., 7 August 1897, *Horner, 341;* 11 June 1897, *121.*

OREGON: Near Snake River, 25 May 1898, *Cusick, 1887;* Stein's Mts., 30 June 1898, *Cusick;* without locality, 1879, *Cusick, 614;* Pine Creek, July 1893, *Mrs. R. M. Austin, 121;* Quartz Valley, Lake county, *Mrs. R. M. Austin;* Mt. Ashland, 9 July 1886, *Henderson;* Wallowa River below the Lake, 10 August 1899, *Cusick, 2323;* Powder River Mts., August 1896, *Piper, 2494.*

CALIFORNIA: Cottonwood Creek, White Mts., 13 July 1891, *Coville and Funston, 1811;* Siskiyou Mts., June 1884, *Howell, 219;* Sisson, Siskiyou county, *H. E. Brown, 327;* near Mineral Springs, Tulare county, 4 August 1891, *Coville & Funston, 1484;* Janesville, Lassen county, 29 June 1892, *Brandegee.*

IDAHO: Banks of Kootenai River, 1861, *Lyall.*

UTAH: Thistle, 29 June 1894, *M. E. Jones, 5529;* without locality, 1891, *Mrs. W. C. Dodd.*

MONTANA: Spanish Basin, Gallatin county, 26 June 1897, *Rydberg & Bessey, 4895;* Bridger Mts., 12 June 1897, *Rydberg & Bessey, 4896.*

Echinospermum subdecumbens Parry (Proc. Davenport Acad. 1: 48) is probably a synonym of *L. diffusa;* at least an authentic specimen in young flower in the Gray Herbarium seems to be referable here. The specimen is from central Utah.

3. **Lappula Hendersoni** sp. nov.

Perennial, erect, 60–80 cm. high, rather sparsely and softly pubescent with appressed hairs, leafy to the top: leaves green, thin, the

radical spatulate-lanceolate; cauline lanceolate, attenuate, sessile, gradually reduced upward, the upper ones ciliate with long hairs, the middle ones 5–10 cm. long: flowering branches racemosely arranged: cymes 5–10-flowered: calyx-lobes linear-lanceolate, obtusish: corolla white, 10–12 mm. broad; appendage as broad as long, merely papillate, the protuberance oblong, short, scarcely protruding into the throat: fruit (nearly mature) about 6 mm. long, on longer recurved pedicels; back of nutlets flat, muriculate, bearing a few scattered short glochidiate prickles; marginal prickles flat, of two lengths, free to the base or nearly so, the longer ones equalling or exceeding the diameter of the back; inner face smooth, the oblong scar central.

Clemens Mountain, Yakima county, Washington, 14 June 1892, *L. F. Henderson* (type). Specimen in herbarium Washington State College.

The following specimens are also confidently referred here:

WASHINGTON: Moist shady rocks, Klickitat county, June 1881, *Suksdorf;* Upper Yakima, 1860, *Lyall.*

OREGON: Cliffs along the Columbia River, August 1880, *T. J. Howell;* Deschutes, 1879, *Howell;* "Hood River, Celilo, etc.," June 1886, *Henderson, 88.*

A doubtful specimen is Howell's no. 335, Rooster Rock, Ore., with blue flowers.

The Suksdorf and Henderson specimens have mature fruit. In these the back of the nutlet is more or less convex, with a faint central ridge, muriculate, bearing 10–12 short glochidiate bristles; ventral surface sparsely muriculate, the oblong scar central.

4. **Lappula trachyphylla** sp. nov.

Probably perennial, apparently about 60 cm. high: stem and branches hispid: upper leaves sessile, lanceolate, attenuate-acuminate, 4–5 cm. long, harshly scabrous on both faces with hispid, papillate-based hairs; upper leaves passing gradually into the bracts of the inflorescence: branches 10–15 cm. long, loosely 10–15-flowered: calyx-lobes attenuate, hispid, 4–5 mm. long: corolla white, the tube not exceeding the calyx, the limb 10–12 mm. broad; appendages as broad as long, merely papillose, the protuberances small: pedicels decidedly longer than the fruit: nutlets 5 mm. long, the marginal prickles free to the base; back plane, muriculate, bearing several short glochidiate prickles; ventral side muriculate, the scar central.

A single fragmentary specimen in the Gray herbarium, collected by Winslow J. Howard in Montana. Associated with it are two inflorescences of *L. diffusa*.

5. LAPPULA PINETORUM Greene, Pittonia, **2**: 182. 1891

Echinospermum pinetorum Greene; Gray, Proc. Am. Acad. **17**: 224. 1872.

This species appears from the specimens to be an annual. The following specimens are in the Gray herbarium:

NEW MEX.: Pinos Altos Mts., July and September 1880, *Greene*.

ARIZONA: Santa Rita Mts., 13 July 1881, *Pringle, 349;* North Arizona, 1884, *Lemmon, 3211*.

6. LAPPULA ARIDA Piper, Bull. Torrey Club, **28**: 44. 1901

In addition to the specimens cited in the original description the following are referable here:

WASHINGTON: Without locality, 1889, *G. R. Vasey, 419*.

OREGON: Camp Harney, 26 May 1885, *Howell;* Camp Harney, 1875, *Captain Bendire;* Drew's Valley, Lake county, *Mrs. R. M. Austin 282*. This specimen is referred to *L. arida* with considerable hesitation.

The two following species are very near allies, and further material may compel their reduction. In all three the fornices of the corolla are practically identical.

7. **Lappula saxatilis** sp. nov.

Perennial, about 30 cm. high, rather slender, cinereous throughout with a fine short rather soft pubescence intermixed with some longer hairs, especially on the petioles of the lower leaves and margins of the upper ones: radical and lower cauline leaves oblanceolate, acute, the petioles as long or nearly as long as the blades; upper cauline lance-linear, sessile by broad bases; bracts of the inflorescence leaf-like; branches 6–10-flowered; calyx hispid, the lobes 2–3 mm. long: corolla blue, rotate, about 7 mm. broad; appendages pubescent, broader than long, exceeded by the obovate-oblong protuberance: fruit small, 3–4 mm. long; marginal prickles 4–5 on each side, subulate, glochidiate, slightly united at base; dorsal surface muriculate, bearing a few short glochidiate prickles; ventral surface smooth; scar central.

Rocky sides of cañons, Klickitat River, Wash., 12 June 1885, *W. N. Suksdorf, 592*. Type specimen in Gray herbarium.

Very close to *L. arida*, differing in its smaller blue flowers, softer pubescence, and the smaller fruit without granulations on the ventral side.

8. **Lappula Cusickii** sp. nov.

Perennial, erect or ascending, 15–30 cm. high, the caudex thickly clothed with old leaf bases, the whole plant pale bluish-green with a very closely appressed fine pubescence, except on the petioles where it is hirsute-ciliate: radical leaves lanceolate, acute, 4–8 cm. long, the petioles equaling the blades; cauline leaves linear-lanceolate, acute, all but the lower sessile by broad bases, 2–5 cm. long: inflorescence corymbose, the false racemes 6–8-flowered: calyx-lobes linear, acute, 2 mm. long: corolla blue, 5–6 mm. broad; appendages short pilose, about as long as broad, the protuberance oblong, as long or longer; immature fruit 5 mm. long, the back flat, muriculate, and bearing about 10 short glochidiate bristles; marginal prickles flat, separate and rather distant, all glochidiate, shorter than the diameter of the nutlet.

Logan Mountains, eastern Oregon, 6500 feet altitude, in the shelter of juniper, 1 July 1901, *W. C. Cusick, 2623*.

This species is related to *L. arida*, differing in its smaller blue flowers and the separate marginal prickles of the nutlet.

9. LAPPULA CAERULESCENS Rydberg, Flora Montana, 328. 1900

This species is readily distinguished from any other described species by the long hairs of the corolla-appendages. At least one other undescribed species represented in the Gray herbarium by too scanty material, has a very similar corolla-appendage, so that this character alone can not be entirely relied upon.

The species as here interpreted shows considerable variation as regards pubescence, and in some specimens the flowers are apparently white.

MONTANA: Bridger Mts., 18 July 1897, *Rydberg & Bessey, 4899*.

WYOMING: Mammoth Hot Springs, 30 June 1899, *A. & E. Nelson, 5602*.

UTAH: Salt Lake City, May 1891, *Eastwood;* Salt Lake City, 30 April 1898, *W. Travers;* Salt Lake City, May 1889, *Sarah K. White;* Wasatch Mts., May 1869, *Watson, 860;* Pine Valley, June 1874, *Parry, 172*. In this plant the pubescence is hirsute, and it was included by Dr. Gray under *Echinospermum*

ursinum. The fornix is exactly like that of the present species, but it is possible that fruiting material may show additional characters.

NEVADA: Battle Mts., June 1868, *Watson, 860;* Humboldt Mts., 27 May 18—, *Beckwith.*

In the original description of this species the fruit was not described. The following are its characters as it occurs on the Nelson specimen above cited:

Nutlets 3 mm. long; marginal prickles of two lengths, free to the base or nearly so, all glochidiate; back plane or with a more or less evident central ridge densely finely muriculate and bearing about ten short glochidiate prickles; ventral surface finely rugose.

10. LAPPULA HISPIDA Greene, Pittonia, **2**: 182. 1891

Echinospermum diffusum var. *hispidum* Gray, Proc. Am. Acad. **17**: 225. 1882.

E. hispidum Gray, Proc. Am. Acad. **20**: 259. 1884.

This species differs from any other which I have examined in having the corolla-lobes broadest at base. The species proper has been collected only by Cusick in eastern Oregon as follows: 1880, rocky hillsides of Pine Creek near the mouth, *855;* 31 May 1898, hillsides near Snake River, *1906;* 15 June 1898, Burnt River, *1906;* without locality, 1885.

The Wilcox specimen referred here by Dr. Gray in the original description belongs to *L. cinerea* as above. The Watson specimen referred here with some doubt in the Synoptical Flora (**2**: 422) is an undescribed species.

11. LAPPULA CILIATA Greene, Pittonia, **2**: 182. 1891.

Cynoglossum ciliatum Dougl.; Lehm. Pugillus, **2**: 24. 1830.

Echinospermum ciliatum Gray, Proc. Am. Acad. **17**: 225. 1882.

The original specimens of this species were collected by Douglas according to the note in Hooker's herbarium, "On the gravelly banks of mountain streams near the head springs of the Columbia"; according to the note in Bentham's herbarium, "Kettle Falls and Spokan River, 1826."

The plant is quite common on the gravelly bluffs of Latah Creek and of the Spokane River within the environs of Spokane,

Wash. The following specimens agree exactly with the Douglas specimen in the Gray herbarium.

Spokane, 1 June 1891, *Henderson;* Spokane, 16 May and 2 July 1896, *Piper, 2292;* Hangman Creek, 18 May 1893, *Sandberg & Leiberg, 36.*

The following is a description of the fruit:

Nutlets 5 mm. long; marginal prickles united for about half their length into a wing, all the prickles glochidiate; back plane or usually with a faint central ridge, roughly muriculate and bearing eight or ten short glochidiate prickles; ventral surface smooth, the scar central.

12. **Lappula setosa** sp. nov.

Perennial, 30–60 cm. high, bristly hirsute throughout, without any finer pubescence: radical leaves linear-oblanceolate, obtuse or acute, 6–10 cm. long including the petioles; cauline sessile or nearly so, linear or lance-linear, gradually reduced upwards; calyx-lobe oblong-linear, obtuse, hispid, 3–4 mm. long: corolla bright blue, 12–15 mm. broad, the tube not exceeding the calyx; appendage semicircular, short pilose, the protuberance small: fruit 5 mm. long, the marginal prickles united for one half their length into a wing: dorsal surface nearly plane, granulate scabrous, bearing a few very short glochidiate bristles; ventral surface granulate, the narrowly triangular scar central.

OREGON: Waldo, June 1884, in flower, *Howell, 218.*

CALIFORNIA: Siskiyou Mountains, 17 June 1884, in flower, *Howell;* Snow Mountain, 23 June 1892, in flower, *Brandegee;* Sierra Valley, July 1883 (type), in fruit, *Lemmon.* Specimen in herbarium California Academy of Science.

A well-marked species, easily recognized by its large blue flowers and bristly pubescence.

13. **Lappula cinerea** sp. nov.

Perennial, erect, 40–60 cm. high, cinereous throughout with appressed pubescence, some coarser hispid hairs intermixed, the larger of which are papillate at base: basal leaves linear or linear-lanceolate, obtusish, 6–10 mm. long; cauline similar, rather few, reduced upwards: inflorescence in fruit loose, the branches 5–20 cm. long: calyx-lobes linear-lanceolate, acute: corolla white, the tube 2 mm. long, the obovate-orbicular lobes 3 mm. long; appendages short-pilose, the crest semicircular in form, retuse at apex, the protuberance on the inner side hemispherical, and separated

by a smooth depression from the pilose crest: nutlets 3–4 mm. long, the marginal prickles united at base for about half their length, all glochidiate; dorsal surface with a faint central ridge, muriculate, and bearing 6–12 glochidiate bristles half as long as the marginal ones; inner face smooth, the oblong scar central.

Salmon River bluffs, Idaho, altitude 2500 feet, 2 July 1895, *L. F. Henderson, 3006*. Type in the U. S. National herbarium, no. 231836.

I would also refer here two specimens from Boise, Idaho; one collected by A. Isabel Mulford, July and August, 1892, which in the Gray herbarium specimen is mixed with *L. floribunda;* the other collected June 1881, by *Dr. T. E. Wilcox* and referred by Dr. Gray to *L. hispida*. The fruit of the Wilcox specimen is rather larger than that of the type, being 5 mm. long.

14. LAPPULA URSINA Greene, Pittonia, **2**: 182. 1891

Echinospermum ursinum Greene; Gray, Proc. Am. Acad. **17**: 224. 1882.

No other material has been seen of this species except that which was before Dr. Gray. Fendler 633 from New Mexico referred here by Dr. Gray is very probably a distinct species undescribed. Parry's 172 collected in South Utah in 1874 is a form of *L. caerulescens*.

15. **Lappula scaberrima** sp. nov.

Perennial, erect, 25–50 cm. high: stems softly hirsute below, hispid above: leaves harshly hispid on both faces, the closely appressed short hairs with papillose bases; basal leaves spatulate-oblanceolate, obtuse, petioled; cauline oblong-lanceolate, acutish: branches of the inflorescence with 15–25 rather densely crowded flowers: calyx hispid, the ovate-oblong lobe obtuse: corolla blue, the tube barely exceeding the calyx, the limb 5 mm. broad; appendages broader than long, papillose, the protuberance small: fruit 5 mm. long on recurved pedicels about as long: nutlets with the marginal prickles united into a wing, all glochidiate; back smooth with a prominent heel; ventral surface smooth, the triangular scar central.

Cripple Creek, Colo., 3 August 1897, *Eastwood*, type, in herbarium Cal. Academy of Science.

Above Idaho Springs, Colo., August and September 1874, *Engelmann*.

A species probably nearest related to *L. floribunda*. The united marginal prickles and scabrous foliage easily distinguish it.

16. **Lappula Californica**

Echinospermum Californicum Gray, Proc. Am. Acad. **17**: 225. 1882 (in part).

Perennial, erect, leafy, green, 30–80 cm. high: pubescence fine and sparse, soft below, almost hispidulous above in fruiting specimens: lower leaves oblong-lanceolate, obtuse or acute, the petioles nearly as long as the blades; middle leaves oblong-lanceolate, sessile by broad bases; upper leaves lanceolate or even ovate, sessile or partly clasping, mostly acute: panicle in fruit open, the branches about 6-flowered: corolla white, its tube barely exceeding the calyx; appendage broader than long, puberulent, the protuberance small: nutlets granulate-muriculate on both faces; dorsal face and margin bearing 20–30 glochidiate subulate separate prickles, as long as the diameter of the nutlets, with shorter ones intermixed; scar central, large, ovate-triangular.

The following specimens are referred here.

CALIFORNIA: Mt. Shasta, 6000 ft. alt., 23 August 1881, *Pringle* (type); Mt. Shasta, 5000 ft. alt., 1862, *Brewer, 1416*; Sisson, July 1892, *Brandegee*; near Webber Lake, 1875, *Lemmon, 1204*; Lake Tahoe, *Lemmon, 205*. Both the Lemmon specimens have the prickles of the fruit purple, and the nutlets apparently smooth on the ventral side; Prattville, Plumas county, 2 April 1892, *Brandegee*; Prattville, Plumas county, June 1878, *R. M. Austin*.

OREGON: Near "Three Sisters," 5 August 1881, *Henderson*; Black Butte, Crook county, 19 July 1901, *Cusick, 2680*.

17. **Lappula velutina** sp. nov.

Perennial (or perhaps biennial), tall and stout, 30–90 cm. high, clothed throughout with a dense velvety pubescence: lower cauline and radical leaves spatulate-oblanceolate, acutish, 8–10 cm. long; cauline numerous, mostly sessile by broad bases, oblong-linear or lanceolate, acute or obtuse, gradually reduced upwards, 2–8 cm. long: inflorescence open, the branches 5–10-flowered: calyx densely pubescent, the oblong lobes obtuse: corolla blue or sometimes pink, its tube 5 mm. long, much exceeding the calyx, the limb 10–12 mm. broad; appendages very large and conspicuous, one third as long as the corolla lobes, the deeply cordate crest short-pilose, equalled in length by the oblong protuberance:

fruit 6–8 mm. long, shining, covered all over with subequal glochidiate separate prickles; ventral surface smooth, the scar central.

This is apparently the commonest California species. It is readily distinguished from all others at a glance by its velvety pubescence, its large blue salverform corollas, and the very prominent corolla appendages.

The following specimens have been examined, all from California: General Grant Grove, 20 July 1892 (type in herbarium California Academy of Science), *Brandegee;* General Grant Park, 1–13 July 1899, *Eastwood;* Lake Tahoe, June 1900, *Miss King;* Lake Tahoe, July 1895, *Abraham;* Lake Tahoe, *Lemmon*, Tulare county, June 1896, *Purpus, 1777;* Humboldt county, 1885, *C. C. Marshall;* Amador county, June 1886, *Mrs. Wiley;* Armstrong Station, 13 June 1895, *G. Hansen, 1141;* Summit, Eldorado county, July 1899, *Blaisdell, 96.*

The Cusick specimen was distributed as a new species but on further study it is thought best to refer it here.

It has been a matter of some difficulty to decide upon a type for this species, inasmuch as Dr. Gray confused three very different plants under one name and did not definitely indicate a type either in the published description or in his herbarium. The difficulty is easily understood from his original description which follows:

"3. Comparatively large-flowered, perennial, with tube of the corolla surpassing the calyx and about the length of the lobes: nutlets of the globose fruit equally armed over the whole surface and margins with long and slender but flattish minutely glochidiate prickles.

"E. CALIFORNICUM. *E. diffusum* Gray, Syn. Fl. (excluding small-flowered specimens which belong to the true *E. diffusum*, and *excl. syn.* Kellog?) not of Lehm. Sierra Nevada, California, from Mount Shasta southward. This was taken for Lehmann's *E. diffusum*, because of his description of the corolla ('Corolla alba? magna, tubus calyce paullo longior sensim ampliatus'); and Californian specimens of the real *E. diffusum* were mixed with it. The original specimens of the latter do not have the exserted tube of the corolla which marks the present species when in blossom, as does the fruit at maturity. It is the *E. nervosum* of Kellog; but neither the leaves nor the sepals are perceptibly nervose (the former not '3–5-nerved' nor the latter '3-nerved'), so that the name would be a false one."

It is perfectly clear that the flower characters of the above description were taken from the specimens *L. velutina* and *L. nervosa* as they alone have salverform corollas. The fruiting characters were drawn from the Brewer and Pringle specimens, perhaps also

from the Lemmon specimens. As the flower characters are the most important in separating *L. Californica* and *L. velutina*, and presumably of *L. nervosa* the fruit of which is unknown, one might justly lay stress on this element of the description. This course would either reduce *L. Californica* to a synonym of *L. nervosa*, or compel its use for the other salverform-flowered segregate, *L. velutina*.

The type range as given in the original description, however, points clearly to the Pringle and Brewer specimens as the type as only these Mt. Shasta species were before Dr. Gray. On the whole it has seemed to us best to retain the name *L. Californica* for this Mt. Shasta plant. We therefore designate the Pringle specimen as the type because it is in better condition than the Brewer specimen.

South Sierras, *Bolander, 2784*; without locality, *Bridges, 317*; without locality, *Gray, 1872*.

18. LAPPULA NERVOSA Greene, Pittonia, **2**: 182. 1891

Echinospermum nervosum Kellogg, Proc. Calif. Acad. **2**: 146. 1862.

Perennial, erect, leafy, 20–40 cm. high, finely appressed pubescent throughout but green: leaves 3–8 cm. long, oblong-linear or somewhat oblanceolate, acute or obtuse, the upper sessile by broad bases, the lower narrowed into margined petioles: panicle rather narrow: calyx small, 2 mm. long: corolla blue, its tube 4–5 mm. long, much exceeding the calyx, the limb about 6 mm. in diameter: appendage quadrate, minutely pilose, the protuberance very small: fruit not seen.

An apparently authentic fragment of the type is in the Gray herbarium, labelled "Acad. Calif. sent by E. L. Greene." This is matched by several specimens in the herbarium of the California Academy of Sciences as below cited. The plant is clearly different from *L. Californica* and from *L. velutina*, and should easily be recognized by its small salverform corollas with small appendages.

CALIFORNIA: Summit, Placer county, 8–16 June 1898, *Alice Eastwood*; Summit, Placer county, July 1876, *Henry Edwards*; Summit, Placer county, 5 July 1886, *Sonne, 69*; Yosemite Valley, May and June 1900, *Bioletti*; without locality, 1872, *Bolander*.

19. **Lappula Cottoni** sp. nov.

Perennial, erect, 40–60 cm. high, pale green throughout with appressed rather harsh white hairs, equally leafy to the top: leaves rather numerous, the radical spatulate, lanceolate, acute, petioled, 10–15 cm. long, the cauline linear or linear-lanceolate, acute, sessile or nearly so by broad bases, 2–5 cm. long: flowering branches racemosely arranged: lower bracts leafy, the upper much reduced: calyx-lobes linear, obtuse or acutish, 2–3 mm. long: corolla yellowish, 6–7 mm. broad, the lobes oval, broadest above the base: appendages broader than long, short pilose, the hemispherical protuberance nearly as long.

North slope of Rattlesnake Mountains, Yakima county, Washington, 11 May 1901, *J. S. Cotton, 360.* Type in herbarium Washington State College.

A species with the aspect of *L. Californica* but with smaller yellowish flowers, very different corolla appendages and more leafy inflorescence.

Some Mt. Desert Fungi

By V. S. White

The country in the neighborhood of Bar Harbor forms a specially interesting collecting ground for the mycologist because of the quantity of wooded land which remains in spite of the constantly increasing clearings and improvements. The woods are moist and kept in this condition even in very dry weather by numerous springs, underground streams and rivulets.

A system of paths originally begun by some of the first Boston visitors, modeled on that in use about the forests of Thüringen near Eisenach is maintained by the Village Improvement Society. The paths extend many miles in various directions; pocket maps are to be had on which the paths are marked in different colors to correspond with the colors painted upon the trees at short intervals or on occasional signposts; rude arrows formed by forked white birch branches indicate the entrace to these paths and are also placed at points of intersection, so that there can be no danger of going astray or unnecessarily out of one's way except from heedlessness. These paths though kept free from underbrush and occasionally cleared of dead wood, do not interfere with the natural beauty and wildness of the place and render the task of the collector a far easier and pleasanter one than it would otherwise be. The present list of fungi collected in the vicinity of Bar Harbor, Mount Desert, Maine, from 8 July to 15 September 1901, by the writer have been determined principally by Professor Charles H. Peck. Professor F. S. Earle of the New York Botanical Garden, Professor Underwood of Columbia University, Dr. W. A. Murrill of New York, and Mr. H. J. Banker of California, Pa., have also aided the writer in making determinations. Dried specimens with notes and in some cases water-color sketches have been deposited with the New York Botanical Garden. It is hoped that in the future this list may be greatly enlarged as the fungus flora becomes better known. The present list may serve as a preliminary supplement to Rand's Flora of Mount Desert Island from which the fungi were omitted. The

one hundred and twenty species marked with an asterisk (*) are not found in Ricker's List of Maine Fungi (April 1902).

Preliminary List of Bar Harbor Fungi

MYXOMYCETES

ARCYRIA NUTANS (Bull.) Grev.
ARCYRIA INCARNATA Pers.
DICTYDIUM CANCELLATUM (Batsch) Macbr.
FULIGO SEPTICA (Link) Gmel. Common.
LEOCARPUS FRAGILIS (Dicks.) Rost.
LYCOGALA EPIDENDRON (Buxb.) Fr.

ASCOMYCETES

Family HYPOCREACEAE

CORDYCEPS ENTOMORRHIZA (Dicks.) Fr. Only one specimen found.
HYPOCREA RUFA (Pers.) Fr. One form.
HYPOMYCES LACTIFLUORUM (Schw.) Tul. On *Lactarius piperatus.* Plentiful.
NECTRIA EPISPHAERIA (Tode) Fr.

Family CHAETOMIACEAE

*CHAETOMIUM OLIVACEUM C. & E.

Family DIATRYPACEAE

DIATRYPA STIGMA (Hoffm.) De Not.

Family XYLARIACEAE

HYPOXYLON COHAERENS (Pers.) Fr. Common.
HYPOXYLON COCCINEUM Bull. Very plentiful.
XYLARIA POLYMORPHA (Pers.) Fr.

Family MOLLISIACEAE

* MOLLISIA MELALEUCA Fr.

Family HELOTIACEAE

HELOTIUM CITRINUM (Hedw.) Fr.

Family PEZIZACEAE

LACHNEA HEMISPHAERICA Wigg.
LACHNEA SCUTELLATA (L.) Sacc.

DASYSCYPHA AGASSIZII (B. & C.) Sacc. Very plentiful in certain localities.

PEZIZA BADIA Pers. Widely distributed.

Family GEOGLOSSACEAE

GEOGLOSSUM HIRSUTUM Pers. Found only once but growing in large quantities.

LEPTOGLOSSUM LUTEUM (Peck) Sacc. Common on moss-grown decayed stumps.

LEOTIA LUBRICA (Scop.) Pers. Very plentiful in damp woods.

BASIDIOMYCETES

Family PUCCINIACEAE

GYMNOSPORANGIUM CLAVIPES C. & P. On *Juniperus Virginiana.*

Family AURICULARIACEAE

AURICULARIA AURICULA-JUDAE (L.) Schroet. Growing in large quantities in certain localities.

Family TREMELLACEAE

TREMELLODON GELATINOSUM (Scop.) Pers. Plentiful.

Family THELEPHORACEAE

CORTICIUM EFFUSCATUM C. & E.

CORTICIUM INCARNATUM (Pers.) Fr. Plentiful.

CRATERELLUS CORNUCOPIOIDES (L.) Fr. Found only once but in large quantity on hard-packed woody path.

*CRATERELLUS LUTESCENS (Pers.) Fr. Common.

STEREUM HIRSUTUM (Willd.) Pr. Plentiful.

STEREUM OCHRACEOFLAVUM Schwein.

THELEPHORA SCHWEINITZII Peck. Growing in large quantities.

Family CLAVARIACEAE.

CLAVARIA CRISTATA Pers. Common.

*CLAVARIA CIRCINANS Peck. Common.

CLAVARIA FUSIFORMIS Sowerby. Fairly abundant.

CLAVARIA INAEQUALIS Müll.

CLAVARIA PISTILLARIS L. Few specimens found.

Family HYDNACEAE.

* HYDNUM ALBONIGRUM Peck. Found only in one locality.

* **Hydnum boreale** Banker, sp. nov. Plant white to greenish, moist; pileus thick, convex, undulate, 12–15 cm. wide; stem short, thick, flattened, the longer diameter three times the shortest (2 cm. by 7 cm.), 7 cm. long; teeth short, 5 mm. long, 0.5 mm. wide, the points rounded and somewhat knobbed when dry, decurrent, brownish with white tips; substance zonate within, the uppermost layer white spongy thick, the lower strata becoming darker, harder, and more compact, in the stem deep lavender color; mycelium purple, persistent; odor unpleasant.

In damp rich soil and leaf mould.

HYDNUM CARBUNCULUS Secr. (= *H. ferrugineum* Fr.) The peppery taste of this species has not been previously noted and is an important character.

* **Hydnum humidum** Banker, sp. nov. Plant yellowish, becoming brown, hygrophanous, pileus irregular, spongy, scrobiculate, 9 cm. or more wide, stem stout, brownish, about 2 cm. long, 1.5 cm. thick; teeth long, 5 mm., brownish with white tips; substance corky, hard when dry and gray like weathered wood but with streaks and spots that appear darker and cartilaginous, which cut as if gummy, zonate internally; odor strong but not unpleasant; taste mild.

In hard-packed wooded path. The fresh plant exudes water freely when pressed between the fingers.

HYDNUM REPANDUM L. Fairly common.

* HYDNUM SCROBICULATUM Fr.

HYDNUM ZONATUM Batch.

Family POLYPORACEAE.

DAEDALEA CONFRAGOSA POLYPOROIDEA Peck. Plentiful.

FAVOLUS ALVEOLARIUS (DC.) Quel. Fairly abundant.

POLYPORUS ADUSTUS (Willd.) Fr.

* POLYPORUS CARPINEUS Sower.

POLYPORUS CARNEUS Nees.

POLYPORUS CHIONEUS Fr.

POLYPORUS CONNATUS Wein.

* POLYPORUS CONFLUENS (A. & S.) Fr. Plentiful.

POLYPORUS ELEGANS (Bull.) Fr. Fairly abundant.

POLYPORUS FOMENTARIUS (L.) Fr.

POLYPORUS LEUCOPHAEUS Mont.

POLYPORUS PERENNIS (L.) Fr.

POLYPORUS PICIPES Fr.

POLYPORUS PERGAMENUS Fr. Very common.

POLYPORUS SCHWEINITZII Fr. Plentiful.

POLYPORUS SCHWEINITZII DUALIS Peck.

POLYPORUS SPLENDENS Peck. (*P. oblectans* of Ricker's list, but that species is not likely American.)

POLYPORUS SULFUREUS (Bull.) Fr.

POLYPORUS VERSICOLOR (L.) Fr. Very common in all localities.

POLYPORUS VAPORARIUS Fr.

LENZITES SEPIARIA Fr.

TRAMETES CINNABARINA (Jacq.) Fr.

* TRAMETES RUBESCENS Fr.

Family BOLETACEAE

BOLETINUS PICTUS Peck. Common in damp places, *Sphagnum*, etc.

* BOLETUS ALBUS Peck. Only one plant seen.

BOLETUS AMERICANUS Peck. Common in damp places.

BOLETUS CHROMAPES Frost. Fairly common but scattered, rarely more than one plant in a locality.

* BOLETUS CYANESCENS Bull. Common.

* BOLETUS EDULIS Bull. Plentiful.

* BOLETUS EDULIS CLAVIPES Peck. Common.

* BOLETUS FELLEUS Bull. Rather scarce.

BOLETUS GRANULATUS ALBIPES Peck. Plentiful.

* BOLETUS MINIATO-OLIVACEUS SENSIBILIS Peck. Common.

* BOLETUS ORNATIPES Peck. Very common in woods.

* BOLETUS PIPERATUS Bull. Common in woods and by roadsides.

* BOLETUS PURPUREUS **fumosus** Peck, var. nov. Pileus convex, velvety, smoky brown, flesh creamy-yellow, changing to bluish-green where wounded; tubes depressed about the stem, yellowish-green, the mouths small, brownish-red, the dissepiments slightly decurrent on the stem, changing to greenish-blue where wounded; stem tapering upward, yellow above, colored like the pileus below, bright yellow within, changing to bluish-green where wounded; spores 10 μ long, 5 μ broad.

Pileus 4–14 cm. broad; stem 4–12 cm. long, 1–2.5 cm. thick at the top, 2.5–5 cm. thick at the base.

Woods. July.

This *Boletus* agrees so closely with *B. purpureus* in all its characters except color that it has seemed best to consider it a mere variety of that species, but future investigation may show it to be a distinct species. It does not appear to have any purple hues in either pileus or stem.

* BOLETUS RUSSELLII Frost. Under pines in dry soil; scarce.

BOLETUS SCABER Frost. Very common and variable.

* BOLETUS SCABER MUTABILIS Peck. Common.

* BOLETUS SCABER NIVEUS Peck. Common.

* **Boletus scabripes** Peck, sp. nov. Pileus thick, broadly convex, firm, dry, glabrous, reddish-brown with a bloom; tubes convex in the mass, adnate or slightly depressed around the stem, brown, with very small round darker mouths; stem stout, equal, solid but spongy within, grayish-white, adorned with numerous small projecting black points; spores oblong, fusiform, 12–15 μ long, 4–5 μ broad.

Pileus about 15 cm. broad; stem about 10 cm. long, 2–3 cm. thick.

Rich soil in woods. July. A fine large species but with a disagreeable taste. The black points on the stem are suggestive of those on the stem of *B. scaber*, but they are smaller and more numerous. In drying the plants become black and exude a black juice with a strong odor.

* BOLETUS SUBGLABRIPES Peck. In damp shady soil; only two plants found.

BOLETUS SUBLUTEUS Peck. Very plentiful all summer.

Family AGARICACEAE

(*Cantharelleae*)

CANTHARELLUS AURANTIACUS (Wulf.) Fr. Plentiful.

CANTHARELLUS CIBARIUS Fries. Common and widely distributed.

* CANTHARELLUS FLAVICEPS Peck.

CANTHARELLUS FLOCCOSUS Schwein. Very plentiful in a few localities.

CANTHARELLUS MULTIPLEX Underw. Two specimens. Specimens attaining a large size, some measuring nearly 17 cm. across.

TROGIA CRISPA (Pers.) Fr. Plentiful in a few localities.

(*Paxilleae*)

* PAXILLUS ATROTOMENTOSUS Fr. Found plentifully in one locality; a very showy fungus.

* PAXILLUS INVOLUTUS (Batsch.) Fr. Plentiful.

* PHELLOPORUS RHODOXANTHUS (Schwein.) Peck. Only two plants found; in widely different localities.

(*Coprineae*)

* COPRINUS ATRAMENTARIUS (Bull.) Fr. Plentiful.

COPRINUS ATRAMENTARIUS SILVESTRIS Peck. Found only in one locality but abundant there.

* COPRINUS PLUMBEUS Peck. A large quantity in damp weather.

(*Hygrophoreae*)

HYGROPHORUS CANTHARELLUS Schwein. Fairly common.

* HYGROPHORUS CHLOROPHANUS Fr. Abundant in restricted localities.

* HYGROPHORUS COCCINEUS Schaeff. In large quantities in damp weather.

HYGROPHORUS CONICUS (Scop.) Fr. Abundant.

HYGROPHORUS MINIATUS Fr. Found once or twice only.

* NYCTALIS ASTEROPHORA Fr. Growing on much-decayed specimens of *Russula* and *Lactarius piperatus*. This is a very strange species, in which the lamellae are almost entirely undeveloped and the entire top of the fungus bears the spores.

(*Lactarieae*)

LACTARIUS AFFINIS Peck. Pale form; plentiful.

LACTARIUS CINEREUS Peck. Only two or three plants found.

LACTARIUS DECEPTIVUS Peck. Plentiful.

LACTARIUS DELICIOSUS (L.) Fr. Fairly common in certain localities.

* LACTARIUS FULIGINOSUS Fr. Plentiful.

LACTARIUS GRISEUS Peck. Plentiful in damp woods.

LACTARIUS HYSGINUS Fr. Plentiful in damp woods.

LACTARIUS INSULSUS Fr. Only one plant seen.

* LACTARIUS MACULATUS Peck. Only two specimens found; a showy plant.

* LACTARIUS PIPERATUS (Scop.) Fr. Common.

* LACTARIUS SORDIDUS Peck. Found only once but then in large quantities.

LACTARIUS SUBDULCIS (Bull.) Fr. Plentiful and widely distributed.

* LACTARIUS TORMINOSUS (Schaeff.) Fr. Found twice.

LACTARIUS THEIOGALUS (Bull.) Fr. Found in only one locality growing in leaf mould.

LACTARIUS UVIDUS Fr. Only a few plants found, some growing on wood.

LACTARIUS VOLEMUS Fr. Common.

* RUSSULA ADUSTA (Pers.) Fr. Common.

* RUSSULA BREVIPES Peck. Plentiful.

* RUSSULA BASIFURCATA Peck. Found several times.

RUSSULA DECOLORANS Fr. Plentiful and widely distributed.

* RUSSULA EMETICA Fr. Common.

* RUSSULA FINGIBILIS Britz. Only found three times.

RUSSULA FOETENS (Pers.) Fr. Common.

* RUSSULA FRAGILIS (Pers.) Fr. Only a few plants found.

RUSSULA INTEGRA (L.) Fr. Plentiful.

* RUSSULA LUTEA (Huds.) Fr. Found only one.

* RUSSULA MARIAE Peck. Fairly widely distributed.

* RUSSULA NIGRICANS (Bull.) Fr. Found abundantly in a few localities.

* RUSSULA PULCHRALIS Britz. Plentiful in one locality.

* RUSSULA PALUSTRIS Peck. By roadside; found several times.

RUSSULA PURPURINA A. & S. White-stemmed form; found only once but in large quantities.

* RUSSULA PUELLARIS UMBONATA Peck. Only one plant found.

* RUSSULA ROSACEA Fr. Abundant.

* RUSSULA SCABRIUSCULA Peck. Apparently scarce.

* RUSSULA SORDIDA Peck. Plentiful.

(*Marasmieae*)

LENTINUS LEPIDEUS Fr.

MARASMIUS ANDROSACEUS (L.) Fr. On hemlock needles after rain in large quantities.

* MARASMIUS CONFLUENS Pers.

MARASMIUS OREADES Fr. Forming large nearly complete fairy rings.

MARASMIUS ROTULA (Scop.) Fr. Plentiful.

* MARASMIUS VITICOLA B. & C. Plentiful.

PANUS STYPTICUS (Bull.) Fr. Common.

(*Agariceae*)

(*Evelatae*. With neither volva nor annulus)

* CLITOCYBE ECTYPOIDES Peck. Plentiful on damp banks.

* CLITOCYBE INFUNDIBULIFORMIS Schaeff. Common.

CLITOCYBE LACCATA Scop. Common.

* **Clitocybe marginata** Peck, sp. nov. Pileus fleshy, rather thick, subcampanulate, becoming convex, obtuse or broadly umbonate, glabrous or nearly so, dry, bay red verging to mahogany color, the margin at first involute, flesh yellow; lamellae narrow, close, decurrent, yellowish, reddish on the edge; stem nearly equal, stout, hollow, glabrous, shining, yellowish marked with reddish longitudinal lines; spores subglobose, 5 μ long, 4–5 μ broad. Pileus 5–8 cm. broad; stem 5–8 cm. long, 6–12 mm. thick. Cespitose; growing around decaying stumps. September.

A peculiar species well marked by the reddish edge of the lamellae, reddish lines of the stem and yellowish flesh of the pileus. It is referable to the second subsection of the Disciformes according to arrangement in *Sylloge Fungorum*.

CLITOPILUS CAESPITOSUS Peck. Found only once but in large quantities.

* CLITOPILUS CARNEOALBUS With. Fairly abundant in certain localities.

* CLITOPILUS PRUNULUS Scop. Very common in meadows.

COLLYBIA ABUNDANS Peck. Growing in large clusters.

* COLLYBIA COLOREA Peck. Growing in large quantities, singly and in clusters.

COLLYBIA DRYOPHILA Bull. Common.

* COLLYBIA FAMILIA Peck. Growing in great quantities over old decaying stumps.

* COLLYBIA PLATYPHYLLA Fr. Common.

COLLYBIA RADICATA Relh. Common and variable.

* COLLYBIA RADICATA FURFURACEA Peck. Found only once; seven or eight fine plants growing about a much-decayed stump.

CREPIDOTUS APPLANATUS Pers. Common.

* CREPIDOTUS MALACHIUS B. & C.

CREPIDOTUS VERSUTUS Peck.

* ENTOLOMA CUSPIDATUM Peck. Growing in large quantities.

ENTOLOMA GRAYANUM Peck. Only a few plants seen.

* ENTOLOMA PECKII Burt. Plentiful.

* ENTOLOMA SALMONEUM Peck. Plentiful.

* ENTOLOMA SINUATUM Fr. One cluster of five specimens found; a fine large species.

* LEPTONIA ASPRELLA Fr. Short-stemmed form; fairly common.

* LEPTONIA GRISEA Peck. Four or five plants found.

* LEPTONIA FORMOSA Fr. Fairly common.

* LEPTONIA SERRULATA (Pers.) Fr. A beautiful species which appears to be rare.

* LEPTONIA SUBSERRULATA Peck. A few specimens found in grass two hundred feet from the beach.

MYCENA CORTICOLA Schum. A beautiful little fungus 2 cm. high, growing on wood; only occasionally seen.

* MYCENA HAEMATOPODA Pers. Plentiful in certain localities.

* NOLANEA CONICA Peck. Appears to be scarce; growing on wood.

OMPHALIA CAMPANELLA Batsch. Growing as usual in large quantities on decaying wood.

* OMPHALIA SCABRIUSCULA Peck. Plentiful.

PANAEOLUS CAMPANULATUS (L.) Sacc.

* PANAEOLUS FIMICOLA Fr. Common after rains.

* PLEUROTUS OSTREATUS (Jacq.) Fr. Plentiful, growing in dense clusters.

* PLUTEUS CERVINUS Schaeff. Very common and variable; a white variety found and also a scaly one corresponding to *Agaricus rigens* Pers.

* PLUTEUS GRANULARIS Peck. Only one plant found.

* PLUTEUS UMBROSUS Pers. Found twice on decaying wood.

* TRICHOLOMA ALBOFLAVIDUM Peck. Plentiful.

TRICHOLOMA ALBUM (Schaeff.) Fr. Growing singly in leaf mould.

TRICHOLOMA DAVISIAE Peck. Plentiful.

* TRICHOLOMA FALLAX Peck. On dead leaves and twigs after rain.

* TRICHOLOMA FUMOSOLUTEUM Peck. Abundant.

* TRICHOLOMA LUGUBRE Peck. Plentiful.

* TRICHOLOMA RUTILANS Schaeff. Appears to be rare.

* TRICHOLOMA VARIEGATUM Scop. Found only twice; a pretty species.

(*Velatae*. Provided with a veil, but no volva)

CORTINARIUS ARMILLATUS (A. & S.) Fr. Fairly abundant.

* CORTINARIUS BERLESIANUS Sacc. & Cub. Only two plants found.

* CORTINARIUS CORRUGATUS Peck. Found twice but in large quantities.

* CORTINARIUS ERRATICUS Peck. Plentiful; growing in large semicircles in damp leaf mould.

* CORTINARIUS MULTIFORMIS Fr. Plentiful.

* CORTINARIUS SIMILARIS Peck. Two plants seen.

CORTINARIUS TORVUS Fr. Plentiful in one locality.

CORTINARIUS VIOLACEUS (L.) Fr. Abundant.

* **Cortinarius Whiteae** Peck, sp. nov. Pileus fleshy, hemispherical, becoming nearly plane with a lobed wavy or irregular margin, dry, glabrous, subpruinose, reddish or brownish-orange verging to tawny; lamellae subdistant, deeply and broadly emarginate, reddish-brown becoming brownish-cinnamon; stem long, equal, solid, fibrous, colored like the pileus, adorned with darker fibrous lines or striations; spores subglobose, 7–8 μ long, 7 μ broad.

Pileus 6–12 cm. broad; stem 7–12 cm. long, 1.5–2 cm. thick.

Woods. August. A large species intermediate between *Dermocybe* and *Telamonia*, related to the former by its dry pileus and to the latter by its general aspect and stout solid stem. It gives me pleasure to dedicate it to its discoverer, a most enthu-

siastic mycologist from whose specimens, notes, and colored sketch of the fresh plant the description has been derived.

FLAMMULA FLAVIDA Pers. On fallen spruce in large quantities.

* **Flammula granulosa** Peck, sp. nov. Pileus thin, hemispherical, becoming convex, dry, densely squamulose, tawny; lamellae thin, rather broad, subdistant, adnate or slightly decurrent, pale yellow becoming tawny ferruginous; stem fleshy, rather slender, stuffed, glabrous or sometimes minutely squamulose, colored like the pileus; spores elliptic, generally uninucleate, 7–8 μ long, 4–5 μ broad.

Pileus 1.5–3 cm. broad; stem 2.5–3 cm. long, 1.5–3 mm. thick.

Decaying wood. August. This is a small species but easily recognized by the squamules of the pileus which give to its surface a granular appearance similar to that of the pileus of *Lepiota granulosa*. At the base of the stem there is a colored membranous disk by which the plant is attached to its place of growth.

* FLAMMULA SAPINEA Fr. Appears to be scarce.

FLAMMULA SPUMOSA Fr. Plentiful.

* HYPHOLOMA CAPNOIDES Fr. Found only once; growing singly and in clusters.

* HYPHOLOMA HYDROPHILUM (Bull.) Sacc. A single cluster of five or six found in a hollow at foot of maple in decaying wood and leaf mould; spores a rich purple red.

HYPHOLOMA INCERTUM Peck. Plentiful in paths singly or in clusters.

* HYPHOLOMA PERPLEXUM Peck. Plentiful.

* INOCYBE RIMOSA (Bull.) Fr. Two plants found in deep leaf mould in woods.

* NAUCORIA ERINACEA Fr. Only a few plants found.

NAUCORIA SEMIORBICULARIS Bull. Large quantities found in lawn.

* TUBARIA FURFURACEA Pers. A few specimens found in decaying leaves in damp woods; a pretty little species.

(*Annulatae*. Provided with a veil which remains as a permanent annulus; no volva)

* AGARICUS ABRUPTUS Peck. Many very large specimens found.

AGARICUS CAMPESTRIS L. Abundant in certain localities.

ARMILLARIA MELLEA Vahl. Only one cluster found, which is unusual for this species.

* LEPIOTA ILLINITA Fr. Found in only two localities.

* LEPIOTA NAUCINOIDES Peck. A single plant found in lawn.

* PHOLIOTA AGERICOLA Peck. Only two plants found.

* PHOLIOTA CAPERATA Pers. Plentiful.

* PHOLIOTA CERASINA Peck. In large clusters on decaying spruce.

* PHOLIOTA SQUARROSOIDES Peck. Growing in large clusters; plentiful in certain localities.

STROPHARIA HOWEANA Peck. Only a few plants found in rich woods in leaf mould.

STROPHARIA SEMIGLOBATA Batsch. Common in lawns.

* STROPHARIA STERCOREA Fr. Abundant after rain.

(*Volvatae*. Provided with a volva; usually also with a veil and annulus)

* AMANITA CRENULATA Peck. Only a few specimens found.

* AMANITA FLOCCOCEPHALA Atk. Three or four plants seen.

AMANITA FROSTIANA Peck. Abundant.

*AMANITA MAPPA Fr. Growing singly in rich soil.

AMANITA MUSCARIA (L.) Fr. Abundant.

*AMANITA MUSCARIA FORMOSA Gonn. & Rab. Fairly common.

AMANITA PHALLOIDES Fr. Abundant.

*AMANITA RUBESCENS Fr. Abundant.

AMANITA SPRETA Peck. Rare.

*AMANITA VERNA Fr. Fairly common.

*AMANITOPSIS VAGINATA (Bull.) Roz. A white variety also found.

*AMANITOPSIS VAGINATA FULVA (Schaeff.). Common.

*AMANITOPSIS VAGINATA **crassivolvata** Peck, var. nov. Pileus broadly convex or nearly plane in the mature plant, subumbonate, glabrous, viscid when moist, widely sulcate striate on the margin, creamy yellow; lamellae broad, close, free, white, sometimes tinged with yellow; stem long, equal, hollow or stuffed with cottony fibers, colored like but a little darker than the pileus, volva very thick, loose, white and woolly; spores globose, 8–10 μ broad. Pileus 7–10 cm. broad; stem 15–20 cm. long, about 2 cm. thick.

In damp soil. Although the sheathed *Amanitopsis* is a very variable species, this large form is so well marked by the very thick felty volva that it seems best to separate it as a variety. It does not closely sheath the base of the stem as in the common form but spreads away above and assumes the shape of a wine glass or goblet.

* AMANITOPSIS VOLVATA (Peck) Sacc. Growing singly; three specimens found.

Family SCLERODERMATACEAE

SCLERODERMA VULGARE Hormen. Appears to be rare.

* SCLERODERMA VERRUCOSUM (Pers.) Bull.

Family LYCOPERDACEAE

BOVISTA PILA B. & C. Common in fields.

BOVISTA PLUMBEA Pers. Common in sandy ground near the ocean.

* GEASTER FORNICATUS (Huds.) Fr. Found in one locality only.

* LYCOPERDON ATROPURPUREUM Vitt.

LYCOPERDON GEMMATUM Batsch. Common.

* LYCOPERDON PECKII MORG.

LYCOPERDON PYRIFORME Schaeff. Common.

LYCOPERDON SEPARANS Peck.

LYCOPERDON SUBINCARNATUM Peck.

LYCOPERDON TURNERI E. & E.

Family PHALLACEAE

* DICTYOPHORA DUPLICATA (Bosc.) E. Fisch. Plentiful in woods in one locality.

* MUTINUS CANINUS (Huds.) Fr. A few specimens only found.

NEW YORK, N. Y., July 1902.

Notes on migratory Plants

By E. J. Hill

It is always instructive to study the incoming and habits of introduced plants. This is especially true of those that have become troublesome weeds or may be such if the conditions favor their development. Some of those to be mentioned may be transient visitors, or if persistent, harmless or acceptable additions to the indigenous flora; others are of a very different character. Those are chiefly noticed which have proved of the most interest, and the list does not claim to be complete. Chicago being so great a railroad center, where cars loaded with grain and stock come from so many places to the westward, and from which dump is taken to outlying districts, provides a region with added facilities for the appearance of foreign plants. Among harmless kinds are the following:

Convallaria majalis, L. In the spring of 1899 this was found in the dune region near Miller, Ind. The conditions were such as would have led to the conclusion that it was indigenous had I not frequently been in the locality for several years before, or had found it more abundantly. It was remote from any dwelling where such a plant might be cultivated, in a hollow among the sand hills. I was looking for *Cypripedium acaule* which grows in the locality in just such depressions, and was surprised to find in one of these, hidden among the jackpines, the lily of the valley. The plants were beginning to bloom, it being the middle of May. In such locations the sands are somewhat moist and the ground considerably shaded. The plant most abundantly associated with it was *Maianthemum Canadense*, and the *Convallaria* was as much at home and seemed as flourishing as these. It would be a puzzle to tell how it came to so wild and little-frequented a spot if introduced, as I suppose it must have been.

Cassia Tora L. This was obtained the same season beside a railroad track at Barrington, Ill., about thirty miles north of Chicago. This is quite a distance north of its ordinary range. The

pods were well formed, but it was so late in the season, Sept. 21, that it was doubtful if seeds would ripen.

MENTZELIA NUDA (Pursh) Torr. & Gr. An example of this plant of the western plains was found last summer beside the track of the Santa Fé railroad, just west of this city. This would point to the line of its introduction. The handsome flowers were nearly two inches in diameter.

ERYTHRAEA PULCHELLA (Sw.) Fries. A single specimen of this European plant was detected late in the fall of 1900 among some *Brachyactis angulatus*, an introduction from the West which flourishes along the sides of unpaved streets at South Chicago. Last summer the little centaury plants were observed in great abundance in neighboring pastures and commons of the prairie. It was growing in the short grass like a native to the soil, and had the appearance of having always been there. The soil is sandy, naturally damp or even wet, but now dry for most of the season on account of drainage. It occurred in both dry and moist locations, since the minute seeds are produced in countless numbers. It is well adapted, though an annual, to hold its place and spread rapidly.

LACTUCA PULCHELLA (Pursh) DC. This native of the North and Northwest was found last summer beside a railroad in the western margin of the city. The plants were scattered along the edge of the roadbed for several rods, in a place where it was subject to hard usage, which it seemed to endure well. As it was seeding freely and had this habit, it seemed likely to persist.

BROMUS TECTORUM L. In an article in the Bulletin of the Torrey Club (June, 1899), I reported this as occurring beside a railroad east of Chicago, in the dune region of Indiana. It was first observed in 1897 in a single locality. Since then it has spread extensively and now appears along the road in spots for several miles. In some places the grass forms dense plats covering several square rods, but is mostly confined to ground within the railway inclosures. It flourishes finely in the sand, especially if a little damp, or quite moist in the spring. In such locations it attains a height of 12 to 18 inches. With its nodding panicles it is not an unseemly plant for a railroad wayside. But its rather early fruiting and drying up expose it to fires from passing trains, though the seeds readily renew it annually.

HELIANTHUS PETIOLARIS Nutt. This was mentioned in the same article as growing along railroads both east and west of Chicago. I saw it first in 1897. It keeps its place in localities which it frequented then and has since considerably extended its range. It readily takes root in the dry soil of the railway embankments, sending the root down quite deep for an annual, and from its low habit escapes the destruction that is apt to befall taller plants by the trackmen. As yet it seems confined to such localities.

HELIANTHUS ANNUUS L. The form from the western plains is the one here meant. I noticed it first in 1891, west of the city. It was growing in the dump from stock-cars thrown out in piles along the railway tracks. The following year it was seen growing under similar conditions east of the city. It still continues most abundant in the same kind of habitat, but of late I have met with it in fields, competing with indigenous species more common to such localities, such as *H. grosse-serratus*, *H. giganteus*, *H. doronicoides*. These being perennials keep their ground where the soil is not much disturbed by means of their tuberous rootstocks, plentifully produced, and line the fence-rows and field-borders in cultivated areas. But where the soil has been disturbed, and especially if left unused for a little while, *H. annuus* seems the more agile plant and comes in, to make extensive patches sometimes. The larger leaves and flowers make it a more conspicuous plant than the native kinds, which it equals in height. Sometimes a few clumps or some scattered examples of the garden escape appear among them or in close proximity, and the stems, commonly taller, and the larger flowers, bring them into contrast very effectively. The western sunflower has become a weed, but is so easily destroyed and confined to unused stations that it can hardly be called troublesome.

GRINDELIA SQUARROSA (Pursh) Dunal. Possibly the same cannot be affirmed as to the inoffensiveness of this and the plant next following. The gum-plant was reported as occurring here in 1891, being found at South Evanston, just north of Chicago. Since then it has been found in other localities, generally beside railroads. Last summer I came across it in stations relatively remote from railway tracks, and growing under conditions that led to the thought that it might become an unwelcome denizen of pastures.

These stations were in the southern part of Lake county, Ill., at Lake Zurich and near Barrington. Two considerable patches were seen in pastures and some examples by roadsides. Those found in pastures were the most instructive, and at Lake Zurich were carefully examined, where the patch was of four or five square rods in extent. As the season had been very dry and the land chiefly used for dairying, the cows had cropped the pastures close, taking about everything edible. But the *Grindelia* seemed untouched and flourishing, and being in flower in early September made a fine display of golden yellow amid the parched surroundings. The grass which grew among it had been picked out and nibbled off close up to the stems. The only hint of service was apparently experimental, for some of the plants showed by their branching that the main stem had been taken off at an earlier stage of growth, and the most probable explanation was that the animal had tested something unfamiliar, and finding the gummy, bitter plant unpalatable afterward left it quite alone. If allowed to grow and ripen the seed, as some heads were already mature, a good crop would be furnished for the coming year.

SISYMBRIUM ALTISSIMUM L. As this has been found more common in the vicinity of Jackson Park, the opinion has been expressed that it was introduced to this region at the time of the Columbian Exposition in 1893. But from other collectors I learn of its appearance in the vicinity of Chicago about 1890 at least. It now occurs in various places, sometimes a tall branching weed, as the name indicates, at others low, subglobose, widely branching, of a habit that suggests a good tumble weed. I have seen it chiefly in the latter form, but have not caught it discharging the functions of a tumble weed, which the shape and rather stiff branches would enable it to do if detachable from the ground. Vast number of seeds are produced on these thickly set branches.

MELILOTUS ALBA Desv. The rest of the plants to be noticed are the troublesome kinds, some of long standing, others of more recent introduction. Among those whose behavior has most interested me is the white melilot, the sweet clover of our mothers' gardens. For a dozen or more years I have seen no weed make greater progress in overrunning waste grounds. It seems strange that a plant I knew in childhood as a harmless garden-flower, a

bunch of which grew by the side of nearly every farmhouse, should have become so troublesome. I have since seen it flourishing by waysides in localities where it was then known chiefly as a flower, but nowhere in such abundance as it shows here. Acres of the weed can be seen in the waste ground along the drainage canal and railroads running parallel with it, as well as on the débris of the numerous quarries of limestone. City lots whose soil is in any way disturbed are apt to be stocked with it. As it can attain a height of six or seven feet—three or four feet being a common height, and branching freely—it soon overshadows the more humble plants and becomes the one in possession almost exclusively. In richer soil, especially of bottom lands, its most important competitor is the great ragweed, *Ambrosia trifida*, which grows higher and is apt to supplant it. Being often xerophytic in habit it frequents dry localities, such as hard clay hills and banks, rubbish-heaps of limestone chips and intermingled dirt from quarries. It is a common weed between the grassy border of a highway and the well-beaten track, where the ground is sufficiently disturbed to permit its seeds to germinate but not enough used to destroy the plants. It readily takes root on a hilly slope or bank on which the rains cut out gullies, washing away the soil so as to prevent less hardy plants gaining a foothold. Here in a sense it may serve a useful purpose in holding the soil or preparing for other growth.

AMARANTUS BLITOIDES Watson. This is one of our most persistent weeds. As nearly as I can learn it appeared in the vicinity of Chicago early in the seventies. I saw it first in 1875, after it had become well established, but not covering any great area. Since that time it has spread extensively and become common, particularly along waysides and railways. It bears a great deal of trampling, and grows where it is subject to very hard usage, much like the knotgrass, *Polygonum aviculare*. Being prostrate, it cannot be mown down like the white melilot, but must be pulled or dug up. It is now the most common of our amaranths except in cultivated ground, where the tumble-weed, *A. graecizans*, is better adapted to the abrupt and frequent disturbances of soil due to cultivation. The prostrate plant cannot take advantage of the wind for dissemination. It is often quite troublesome in

lawns, rooting in any spot where the grass is thin, or at the inner edge of the curbstone, the stems creeping in the grass too low to be reached by the lawn mower, or hanging over the edge and perhaps rooting in the gutter if not disturbed for some weeks. It is not uncommon to find mats in favorable situations with stems three or four feet long.

SALSOLA TRAGUS L. This was reported from this region in 1890 or a little before. I have carefully watched it since first seeing it about that time, for the notoriety it had gained in the Northwest called particular attention to it. During this interval it has spread throughout our area, but is not as conspicuous or hardly as plentiful as it was four or five years ago, since it spread very rapidly at first. It is now a common weed of waste ground, struggling with others found in such associations. No systematic effort has been made to exterminate it so far as I have seen or been able to learn. First appearing most commonly along railroad lines, it shares the lot of other growth removed by the trackmen. Little is seen along country roadsides or in cultivated fields. In some vacant lots not far from my dwelling, where the soil was considerably exposed by the plotting of streets and construction of sewers but not occupied for residence, it became abundant soon after making its appearance there, but has since mostly disappeared. Here it was left to natural conditions and no effort was made to get rid of it. It was a dry, sandy soil, and such grasses as *Festuca tenella* and *Sporobolus vaginaeflorus* and plants of similar habit proved more than a match for it. I do not think it will be the troublesome weed under such conditions of cultivation as prevail in the Atlantic States as we were led to expect, or that eastern farmers need to be much alarmed by the inroad of the Russian thistle. It will add another to the list of weeds to be contended with and take its place among the rest, no more burdensome in some respects than others, mainly troublesome when the leaves and branches become stiff in late summer and autumn, and by its ability to be rolled about by the wind, and lodge in obstructed corners. The individual plants are now on the average much smaller than at first, less branched and more upright in growth, and, consequently, less favorably adapted to rolling. Their form changes as they are crowded by other plants, of which

they get the start by their superior ability to spread, but with which they must subsequently contend; or because the plants, when the ground is well stocked with seeds, come up thickly and crowd one another. It is probable, too, that it loses in vigor under less favorable conditions. It stands no chance whatever in maintaining itself against a growth of the common grasses.

LACTUCA SCARIOLA L. I noticed this first in 1885. It was infrequent then, but has since become one of the most common weeds, more generally diffused than *Salsola Tragus*. Its copious pappus permits its easy propagation, and like the dandelion it springs up in pastures and meadows as well as in waste ground. But as stock devour it when tender, little comes to maturity in pastures, but more in meadows and the neglected parts of cultivated fields. Its stiff and rather prickly habit make it more repulsive when grown, but even then the leaves are eaten.

CHICAGO, ILL., April 1902.

Some hymenomycetous Fungi from South America

By Edward A. Burt

In February, 1901, there was sent to me for determination a package of very interesting Hymenomycetes, collected by Professor C. F. Baker in Santa Marta, United States of Colombia, in December, 1898. I am indebted to Professor W. G. Farlow for the privilege of confirming the determinations of some of the species by my comparison with authentic specimens in the Curtis herbarium and to Dr. Lars Romell for his sharing with me several of the species described in his *Hymenomycetes Austro-Americani.*

Lenzites striata Swartz. Nos. 12 and 20. In no. 12 the spores are hyaline, even, inequilateral, 8–9 x 4–4½ μ.

Lenzites repanda (Mont.) Fr. No. 27.

Lenzites Palisoti Fr. No. 29. This specimen has the substance of the pileus slightly darker than in no. 27 and the lamellae slightly darker and more porose-anastomosing. Bresadola, in *Fungi Kamerunenses*, p. xxxv, and Romell, in *Hymenomycetes Austro-Americani*, p. 11, regard *Lenzites repanda* and *L. Palisoti* as but forms of *Lenzites applanata* Fr., a species varying in color and other characters with age.

Polyporus fruticum B. & C. On under side of green coriaceous leaves, no. 19. The fructifications of the specimens sent to me are about 3–5 mm. in diameter — only about one third the diameter of authentic specimens collected in Cuba by Wright (422) but are certainly the same species. The spores, as seen with the microscope in sections, are melleous, even, allantoid or flattened on one side, 3–3.5 x 1.5–2 μ; no setae present in the hymenium.

Fomes carneus Nees. No. 211.

Polystictus arenicolor B. & C. No. 35.

Polystictus flabellum Mont. No. 21. This determination is by Bresadola.

Polystictus hirsutus Fr. No. 210.

Polystictus licnoides Mont. No. 25. Probably this species but immature; the tubes are only barely forming and do not show spores and setae.

POLYSTICTUS MODESTUS Kunze. No. 30. *Polystictus albo-cervinus* Berk. is a synonym.

POLYSTICTUS NILGHERIENSIS Mont. No. 15. This specimen is paler than the description of this species seems to indicate but agrees well with specimens in the Curtis herbarium from Hillsborough, North Carolina, determined by Berkeley.

POLYSTICTUS SECTOR SCHIZODES B. & C. No. 209.

POLYSTICTUS TRICHOMALLUS Berk. & Mont. No. 18.

POLYSTICTUS UNDIGER (B. & C.) Sacc. No. 28. Described as *Polyporus undigerus* B. & C. in *Fungi Cubenses*, No. 282. The Cuban specimens in the Curtis herbarium, collected by Wright (457), are smaller but certainly the same species.

TRAMETES FIBROSA Fr. No. 13. Has been compared with the specimen in the Curtis herbarium, collected in South America by Spruce (20), which is, perhaps, not specifically distinct from *Trametes hydnoides* (Swartz) Fr.

TRAMETES FUMOSOAVELLANEA Romell (POLYPORUS VERECUNDUS B. & C. ?). No. 212. This agrees in all respects with the authentic specimen of his *Trametes fumosoavellanea* received from Romell but differs from the authentic specimen of *Polyporus verecundus* in the Curtis herbarium, collected in Cuba by Wright, *Fungi Cubenses* (220), in having the tubes stratose—three layers present—in the thickest part of the pileus. The other gross characters are so similar to those of *P. verecundus* and so characteristic that I regard the present collection as probably the older, more fully developed fructification of the same species.

TRAMETES STEPHENSII Berk.? No. 11. The specimen is sterile.

HEXAGONIA VARIEGATA Berk. No. 23.

LACHNOCLADIUM BRASILIENSE (Lev.). No. 14. *Thelephora Brasiliensis* Lev.

STEREUM ILLUDENS Berk. No. 24. Vertical sections through the pileus show in the hymenium the peculiar branched cystidia, resembling minute bottle brushes, by which the species is best distinguished from the more common *Stereum gausapatum* Fr. and *S. subpileatum* B. & C.

STEREUM PAPYRINUM Mont. No. 26.

MIDDLEBURY COLLEGE, MIDDLEBURY, VT.

Three new Plants from Washington

By J. S. Cotton

Glyceria latifolia

Culms 70–120 cm. high, smooth and glabrous; sheaths usually exceeding the internodes, loosely embracing the culm, rough; ligule 2–3 mm. long, scarious, truncate; leaves 7 or 8, the blades flat, 20–30 cm. long, 6–10 mm. broad, linear, acute, rough on both sides: panicle ample, 20–30 cm. long, open; branches in twos and threes, spreading, ascending, branching from near the middle; lower branches 10–15 cm. long: spikelets 3 mm. long, 4–7- usually 5-flowered; empty glumes 1–1.5 mm. long, obtuse, 1-nerved: flowering glumes 2 mm. long, very broad, distinctly 7-nerved, scabrous; palet equalling the flowering glume.

This species differs from *G. nervata* Trin. in its much larger size and broader more numerous leaves. It also shows some resemblance to *G. Americana* but differs from that species in its smaller more obtuse glumes and in having a much more coriaceous palet.

Specimens examined: Railroad Creek, Okanogan county, *Elmer, 721* (type); Seattle, *Piper;* Seattle, *Smith, 942;* Cascade Mts., *Lyall, 490;* Stampede Pass, 4 Oct. 1892, *Henderson;* West Klickitat county, *Suksdorf, 1136.*

Astragalus Olympicus

Perennial, spreading from a stout woody root, the branches about 20 cm. long, densely ashy pubescent throughout: leaves 2–3 cm. long; leaflets 6–8 pairs, 8–12 mm. long, oblong, subacute; stipules membranaceous, triangular, 4 mm. long: peduncles two to three times as long as the leaves: raceme about 10-flowered: flowers on short pedicels, the bracts linear, acuminate, longer than the pedicels: calyx-tube 7 mm. long, pubescent with white and black hairs intermixed, the teeth nearly as long as the tube, equal, acute: corolla greenish-white, tinged with purple, about 10 mm. long: pod 1-celled, inflated, membranaceous, glabrous, oblong, 20–25 mm. long, 6–12 mm. wide, acute at each end; stipe slightly exceeding the calyx tube; sutures not inflexed.

Olympic Mts., Clallam county, July 1900, *A. D. E. Elmer.* Belonging to the Section *Inflati* and probably nearest related to *A. Suksdorfii* Howell.

Orthocarpus barbatus

Annual, slender, erect, simple or sometimes sparseyl branched above, 10–20 cm. high, minutely pubescent and sparsely hispid: leaves 2–4 cm. long, deeply 5-cleft, the lobes linear-attenuate; uppermost leaves passing into the bracts of the spike: spike 3–5 cm. long, its bracts oblong, acute, 10–15 mm. long, about 7 mm. wide; the lower ones more or less 3–5-cleft, the upper merely 3–5-toothed: calyx sparsely hispid, 9 mm. long, its lobes deeply 2-cleft into subulate teeth; teeth nearly as long as the tube: corolla yellow, 12 mm. long, with a simply saccate lip inconspicuously 3-toothed, and a moderately smaller triangular galea whose tip is straight and surpasses the lip about 1.5 mm. and is densely pubescent; the rest of the corolla nearly glabrous: anthers 2-celled, the cells equal, oblong, and covered with a few long hairs: capsule ovoid, acute, dark brown to blackish.

This species is closely allied to *O. tenuifolius* Benth., but is distinguished by its acute bracts, and its galea which is straight and densely pubescent. The rest of the corolla is nearly glabrous while in *O. tenuifolius* it is finely puberulent. The capsule is broader just below the middle, not elliptical as in *O. tenuifolius*.

Type collected at the junction of Crab and Wilson creeks, Douglas county, 19 June 1893, *Sandberg & Leiberg, 234*.

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